

Effects of Mobile Instructional App on Undergraduate Students' Academic Performance in Economics in Sokoto State, Nigeria

¹Nura Bawa & ²Asiyatu
Abubakar Bagudo

¹Department of Curriculum Studies
and Educational Technology, Faculty
of Education and Extension Services,
Usmanu Danfodiyo University
Sokoto

²Department of Adult Education and
Extension Services, Usmanu
Danfodiyo University Sokoto

Article DOI:

10.48028/iiprds/ijsreth.v8.i1.02

Keywords:

Mobile instructional
app; Academic
performance;
Undergraduates;
Economics.

Corresponding Author:

Nura Bawa

Abstract

Mobile instructional app (MIA) is a set of instructions put together as a program usually installed on mobile devices to facilitate learning and improve academic performance. MIA helps to motivate students for the enhancement of positive academic performance, thus, it could be utilized in an individualized or in a blended learning environment to supplement traditional teaching-learning process. This study investigated the effects of mobile instructional app on undergraduate students' academic performance in economics in Sokoto State. The study adopted quasi experimental with a pre-test and post-test, non-equivalent comparison involving 2x2 factorial design. All undergraduate students in Sokoto State formed population of the study. A total of 61 undergraduates formed the sample for the study, 34 for experimental group one (23 males and 11 females) from Sokoto State University (SSU) and 27 for experimental group one (22 males and 5 females) from Usmanu Danfodiyo University Sokoto (UDUS). Pilot study was carried out at Federal University Birnin Kebbi using twenty 100 level undergraduates. Economic Principles Test Instrument (EPTI) was used for data collection. Reliability coefficient of 0.78 using Kuder Richardson 20 (K-R, 20) was obtained. Research hypothesis one was tested using analysis of covariance (ANCOVA), while hypothesis two was tested using t-test statistics. The study found among other that the app was academically effective. There was significant difference in the achievement of the undergraduate students exposed to mobile instructional app and those taught using blended approach ($F(1, 58) = 13.649, p < 0.05$) in favour of experimental group 2. There was no significant difference in the academic performance of the undergraduate students taught in a blended learning environment based on gender. The study concluded that the mobile instructional app (MIA) enhanced the academic performance of undergraduates from the two universities (UDUS and SSU) irrespective of gender. It was established by the study that the undergraduates taught in a blended learning environment out-performed those exposed to MIA alone. The study therefore recommended that lecturers should endeavour to develop and utilize mobile instructional apps that are in line with new NUC benchmark to supplement teaching process.

Background to the Study

Education be it formal or informal, is as old as man. Attempts have been made to improve its quality right from the beginning of claim for knowledge (Rena, 2008). In 1963, educational technology was named as a field that is aimed at facilitating learning and improving performance at all levels of education (Bamidele, 2015). The perception of educational technology has gone through different scholarly views. Emergence of information and communication technology (ICT) has made the field of educational technology to become more pronounced (Reiser, and Dempsey, 2012). ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network, hardware and software, satellite systems and so on, as well as the various services and applications associated with them such as video conferencing and distance learning (Azeez, 2014; Elisha, 2006).

Mobile wireless technologies present ways for students to access classroom information and communicate with colleagues and teachers within and outside school environment (Naismith, Lonsdale, Vavoula and Sharples, 2004). The development of ICT has altered the conception of classroom as the only meeting point for learning to “everywhere you go” learning (Ladu, 2015; Wentzel, Ron, Mathilde, Sytze and Alfred, 2005). Ladu (2015) also pointed out that the only challenge is to come up with pedagogies that fit in with the new technological development. ICT has paved a new way to globalization in education (Bamiduro, and Babatunde, 2004). The acceptance and integration of ICT facilities in university for internet access and its implementation enables the university undergraduates to carry out most of their activities ubiquitously on the Internet is steadily growing in the developing nations (Shehu, 2014; Ogunduyile, 2014). In Nigeria, a reasonable number of universities have integrated ICT-related activities such as the use of e-library, management information system (MIS) and online instructions to effectively facilitate learning (Tella, Toyobo, Adika and Adeyinka, 2012). This development has had tremendous impact on students' learning. Mobile technology is one of the components of ICT that tends to attract the attention of many researchers in the world (Ozumba, 2015).

Mobile learning affects learners through cooperation, motivation, availability and information sharing (Adesulu, 2015). Cohen et al., (2011) and Ozumba, (2015) reported that education through mobile technology has positive effect on intensity of motivation. As such, both intrinsic and extrinsic motivation need to be aroused to inculcate students' learning in subjects such as economics, and so on. In the Nigerian National Policy Document (NPD), ICT vision 20:2020 stated that increasing globalization caused by ICT makes it necessary for Nigeria as a developing economy to ensure the development and integration of ICT to facilitate cultural, political, social, educational and economic development. Use of mobile technology has been identified as one of the best approach to proving quality education to youth in Nigeria (NPD, 2012). Utilization of mobile technology in teaching-learning can either be in individualized or blended learning environment.

Blended learning is an approach that combines face to face teaching with other technology enhanced facilities (Dooga, 2010). It could be a combination of instructional package is it mobile or immobile together with the traditional approach of teaching (Azeta, 2012). Blended leaning approach provides details of what is lacking in the learning process (Ogunlade, Bello, Ogunlade, and Soetan, 2013). It helps instructor to teach with ease and students to learn without stress (Olumorin, Yusuf, Ajidagba and Jekayinfa, 2010; Shehu, 2014). Blended learning is one of the best approaches through which a student becomes active and constructive in the learning process (Funmilola, 2012). The implementation of any plan should not start in a full scale, rather, by selecting some subjects or courses such as economics in the universities for trial testing. Economics is a social science that studies human behavior as a relationship between ends and scarce means which have alternative uses (Ferrarini, 2012).

In a university setting, blended instructional approach helps to improve undergraduates' academic performance. Undergraduate refers to someone who is into university for his/her first degree known as "Bachelor's Degree" (Mishra, 2014). At the undergraduate level, the teacher needs to guide students to become better researchers and to think more critically regarding various issues. Undergraduate classes are usually much larger and less individualized. Undergraduates need to be trained to become active members to contribute to economic development. Students from the Department of Economics from Sokoto State University are found to have performed poorly having a wrong believe that economics is the study of complicated tables and charts, statistics and numbers, but, more specifically, it is the study of what constitutes rational human behavior in the endeavor to fulfill needs and wants (Chukwuemeka, 2010).

Considering the educational challenges in the developing countries such as Nigeria and the hope placed on ICTs in solving these problems, e-learning through the use of common technologies (iPod, PDA, tablet and smart phone) should be used especially in universities (Oyibo, 2013). Usmanu Danfodiyo University Sokoto, is one of the universities established by federal government in 1975, but the integration of mobile technology to facilitate learning and improve students' performance has not been put in place (Mahmud, 2013). This may be due to inadequate empirical evidences to prove the effectiveness of using mobile technology in enhancing students' performance. Therefore, this attracted the attention of the researcher to examine the effect of mobile technology instructional package on undergraduates' academic performance in economics in Sokoto State, Nigeria.

In contemporary society, learning has not been restricted to classroom setting. This gives students the opportunity to learn at his/her own pace. This new approach can be referred to as mobile learning. Mobile learning creates new modalities for peer learning and mentorship which in turn leads to an improved academic performance (Muyinda, Mugisa and Lynch, 2007). Integration of mobile devices for mobile learning helps to facilitate teacher efficiency and improve students' academic performance (Bokhare, Azizan and Azman, 2013). Affordability, portability, social interactivity and ubiquitous nature of mobile device makes it a suitable technology for mobile learning.

The fact that most undergraduate students possessed handheld devices such as smart phones, tablet, among others did not imply they are using these devices for learning. Meanwhile, most of the available economics apps being used are not in line with the current NUC benchmark, and this might not yield fruitful academic performance. Hence the need to examine the effect of adapted mobile instructional app on undergraduate students' academic performance in economics in Sokoto State, Nigeria.

Purpose of the Study

The main purpose of this study was to investigate the effect of mobile instructional app on undergraduate students' academic performance in economics in Sokoto State, Nigeria. Specifically, the study intended to:

1. Determine the effects of adapted mobile instructional app usage in an individualized and in a blended setting on undergraduate students' academic performance in economics.
2. Determine whether there is a difference in the academic performance of the undergraduate students exposed to mobile instructional app alone and those taught in a blended setting.
3. Examine whether the performance of undergraduate students taught in a blended setting would vary based on gender.

Research Questions

The following research questions were answered in this study:

1. What are the effects of adapted mobile instructional app usage in an individualized and in a blended setting on undergraduate students' academic performance in economics?
2. What is the difference in the academic performance of the undergraduate students exposed to adapted mobile instructional app and those taught using blended approach?
3. What is the difference in the academic performance of male and female undergraduate students taught economics using blended approach?

Research Hypotheses

Based on research questions 2, 3 and 4, the following null hypotheses were tested:

H₀₁: There is no significant difference in the academic performance of the undergraduate students exposed to mobile instructional app and those taught using blended approach.

H₀₂: There is no significant difference in the academic performance of the undergraduate students taught in a blended learning environment based on gender.

Methodology

A quasi experimental with a pre-test and post-test, non-equivalent, non-randomized comparison involving 2x2 factorial design was adopted for the study. All undergraduates

from Sokoto State, Nigeria, formed the population of the study. All 100 level undergraduate students of Department of Economics from Usmanu Danfodiyo University Sokoto (UDUS) and Sokoto State University (SSU) were purposively selected as target population for this study being the only two universities in Sokoto State. The researcher purposively selected two tutorial groups, one from each university including 34 and 27, 100 level undergraduates from UDUS and SSU respectively as sample for the study. This is because the university where the pilot study was conducted had just commenced operation with only 100 level students. Simple random sampling technique was used to allocate UDUS to experimental group one and SSU to experimental group two through balloting.

Three instruments were used for this study (Mobile Instructional App (MIA); Economic Principles Test Instrument (EPTI) and Lesson Note (LN)). The researcher adapted a mobile instructional app (MIA). To ensure speed, ease of use, interactivity, organizational issues and networking, the mobile instructional app (MIA) was scrutinized by four experts, three from the Department of Educational Technology, University of Ilorin and one from Federal University Birnin Kebbi for construct and content validity. To ensure reliability of the Economic Principles Test Instrument (EPTI), pilot-study was carried out at the Federal University Birnin Kebbi (FUBK) using twenty 100 level undergraduate students from Department of Economics which was not part of the study's population. Kuder Richardson (K-R, 20) reliability coefficient of 0.78 was obtained. Descriptive and inferential statistics were used to analyze data obtained. Descriptive statistics (mean) was used to answer the research question one, analysis of covariance (ANCOVA) was used to test hypothesis one, and independent sample t-test was used to test hypotheses two at 0.05 level of significance.

Results

Research Question One: What are the effects of adapted mobile instructional app usage in an individualized and in a blended setting on undergraduate students' academic performance in economics?

Table 1: Pre-test and Post-test Mean Scores of the Two Experimental Groups

Groups	N	Pre-test Mean	Post-test Mean	Mean Gain Scores
Exp. 1	34	12.79	17.85	5.06
Exp. 2	27	13.37	19.63	6.26

Table 1 showed that experimental group one had mean performance scores of 12.79 before the treatment and 17.85 after the treatment, experimental group two also had mean performance scores of 13.37 before the treatment and 19.63 after the treatment. It revealed that experimental group one had mean gain score of 5.06 while the experimental group two had mean gain score of 6.26. This indicated that both groups benefited from the treatments; hence the mobile instructional app was more effective in the blended setting.

Hypothesis One

There is no significant difference in the academic performance of the undergraduate students exposed to mobile instructional app and those taught the same using blended approach.

Table 2: ANCOVA Result on the Academic Performance of the Undergraduate Students Exposed to Mobile Instructional App and those Taught Using Blended Approach

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	103.634	2	51.817	19.461	.000
Intercept	444.990	1	444.990	167.126	.000
Pretest	56.130	1	56.130	21.081	.000
Groups	36.342	1	36.342	13.649	.000
Error	154.431	58	2.663		
Total	21451.000	61			
Corrected Total	258.066	60			

Table 2 showed the ANCOVA result in respect of hypothesis one. An $F(1, 58) = 13.649$, $p < 0.05$, revealed that there was significant difference in the academic performance of the undergraduate students exposed to mobile instructional app and those taught using blended approach. The null hypothesis was rejected, hence those taught using blended approach performed significantly better than those exposed to MIA alone.

Hypothesis Two

There is no significant difference in the academic performance of the undergraduate students taught in a blended learning environment based on gender.

Table 3: t-test on the Academic Performance of the Undergraduate Students Taught in a Blended Learning Environment Based on Gender

Gender	N	Mean	Std. Dev.	Df	t	Sig. (2-tailed)	Remark
Male	22	19.59	1.79				
				25	0.23	0.824	Not Sig.
Female	5	19.8	2.28				

Table 3 revealed the result of t-test in respect of hypothesis three. The mean score for the male and female from experimental group 2 were respectively 19.59 and 19.80, while the standard deviation for the two groups were 1.79 and 2.28 respectively. The t-test result $t(25) = 0.23$, $p > 0.05$ (two tailed) indicated that there was no significant difference in the academic performance of the undergraduate students taught in a blended learning environment based on gender. Hence the null hypothesis was retained.

Discussions of Findings

The study found that mobile instructional app (MIA) was effective in the two different settings (Individualized and blended). There was a significant improvement in the

academic performance of the undergraduate students when pre-test and post-test means were compared for both the experimental group one and experimental group two. This finding does not dispute the assertion made by Thomas (2005) that mobile technology offers suppleness to learners in terms of knowledge acquisition and practice. It is also in line with the affirmation made by Kipp (2011) that mobile app helps to improve students' academic performance since it promotes individualized learning.

It was found that significant difference existed in the academic performance of the undergraduate students exposed to mobile instructional app and those taught using blended approach. Where the undergraduate students taught using blended approach out-performed those exposed to mobile instructional app alone. This finding does not contradict the assertion made by Sharples et al., (2007) that mobile device supports both grouped and individualized learning. The result supports the findings of Bailey, Ello, Schneider and Ark, (2013) that blended learning helps to improve the quality of teaching and students' confidence to actively participate in the teaching-learning process. Blended learning helps teachers to effectively manage classroom and make learning more effective and student centered (Saliba, Rankine and Cortez, 2013).

The study found that there was no significant difference in the academic performance of the undergraduate students taught in a blended learning environment based on gender. This means that gender does not determine the academic performance of undergraduate students when traditional method of teaching is combined together with mobile instructional app. In this contemporary society, male and female students should be placed on the same scale in the use of technology in classroom (Zamani, 2014). The use of mobile technology for mobile learning has become prominent and effective in the world, and also become vital part of the life of students regardless of being male or female (Wang & Shen, 2011).

Conclusion

This study established that the adapted mobile instructional app generally helped to improve undergraduate students' academic performance in economics. Utilization of mobile instructional app in a blended setting was more effective in improving undergraduate students' academic performance than using it in an individualized setting. Gender had no significant influence on the undergraduate students' academic performance in utilization of mobile instructional app.

Recommendations

The findings of this study led to the following recommendations:

1. University curriculum should be made flexible to accommodate the use of mobile devices for learning process.
2. Researchers should develop more mobile instructional apps that are in line with NUC benchmark for undergraduates' consumption in universities.
3. Lecturers should endeavour to develop and utilize mobile instructional apps that are in line with new NUC benchmark to supplement their teaching and increase productivity.

References

- Adesulu, D. (2015). *Mobile learning technology: Way forward for Universities-Experts* .
<http://www.vanguardngr.com> .
- Azeez, K. (2014). *Crashing Nigerias high internet Cost*
<http://nationalmirroronline.net/new/crashing-nigerias-high-internet-costs/> Accessed August 8, 2015.
- Azeta, A. A. (2012). *A framework for intelligent voice-enabled education system*. Ogun: Covenant University Press.
- Bailey, J., Ello, S., Schneider, C. & Ark, T. V. (2013). *Blended learning guide*, USA: DLN Smart Series.
- Bamidele, A. O. (2015). Impact of mobile technology in transforming education and health sectors in Nigeria: strength and challenges, *International Conference on African Development Issues*, 2 (1), 63-68.
- Bamiduro, J. A. & Babatunde, S. T. (2004). *Prospects and challenges for Nigerian industrial and socio-economic emancipation : Another look at NEEDS* . Lagos, Nigeria: NEEDS.
- Bokhare, S. F., Azizan, S. N., & Azman, N. (2013). Teaching via mobile phone: a case study on Malaysian teachers' technology acceptance and readiness, *Journal of Educators Online*, 2 (2), 19-129.
- Chukwuemeka, O. (2010). New media: New frontier, *International Journal of Social Sciences and Humanities Review*, 1 (1), 12-23.
- Dooga, J. T. (2010). *Learning and teaching english with technology at the University of Jos*. Jos: Compass Newspaper.
- Ferrarini, T. H. (2012). Economics in the media: Cool tools for teaching economics, *Social Studies Research and Practice* , 1 (1), 19-26.
- Funmilola, B. O. (2012). *Effect of multimedia on the performance of junior secondary school students in listening and speaking skills in Giwa educational zone of Kaduna State*. Kaduna: ABU Press.
- Kipp, S. (2011). *Tablets are good, content is better, and teachers are the best educational ICT investment*, Retrieved from Tablet Computers in Education.:
<https://edutechdebate.org/tablet-computers>
- Ladu, L. P. (2015). *It Awaking - A knowledge sharing initiative by knowledge buffers*, Retrieved from Knowledge Buffers: http://www.knowledgebuffers.com/nigeria/nigeriaevent.html?gclid=CIOE6_mJwMcCFWYOWwodJoULng

- Mahmud, A. G. (2013). *Evaluation of school plant landscaping, layout and security in secondary schools in Sokoto metropolis*, Sokoto: Udu press.
- Mishra, R. (2014). *What's the difference between undergraduate and graduate?* Arizona: Arizona State University.
- Muyinda, P. B., Mugisa, K. & Lynch, K. (2007). M-Learning: The educational use of mobile communication devices. *The Educational Use of Mobile Communication Devices*, 1 (1), 290-300.
- Naismith, L., Lonsdale, P., Vavoula, G., Sharples, M., (2004). In literature review in *mobile technologies and learning*. Futurelab Series.
- Ogunlade, O., Bello, O., Ogunlade, A. & Soetan, A. (2013). Cheating among students in the age of digital technology: Secondary school students views in Ilorin South local government, *Proceeding of INTED Conference*, 5 (2), 4961-4968.
- Ogunduyile, A. (2014). Assessing mobile technologies as a mode of pedagogical activities delivery in federal university of technology Akure, *FUTA Journal Research in Science*, 2 (1), 207-217.
- Olumorin, C. O., Yusuf, A., Ajidagba, U. A. & Jekayinfa, A. A. (2010). Development of Instructional materials from local resources for art based courses. *Asian Journal of Information Technology*, 9 (2), 107-110.
- Ozumba, C. B. (2015). *Developing a strong knowledge base for the advancement of African settlements*, Enugu: Nsuka university press.
- Reiser, R. A. & Dempsey, J. V. (2012). *Trends and issues in instructional design and technology*. Upper Saddle River, NJ: Prentice Hall. Seels, B. B., & Richey, R. C. (1994). *Instructional technology: The definition and domains of the field*. Washington, DC: Association for Educational Communications and Technology.
- Saliba, G., Rankine, L. & Cortez, H. (2013). *Fundamentals of blended learning*, Sedney: University of Western Sedney.
- Sharples, M., Taylor, J., & Vavoula, G. (2007). A theory of learning for the mobile age. R. Andrews and C. Haythornthwaite, *The SAGE Handbook of E-learning Research*. 11 (1), 47-221. London: SAGE Publications,
- Shehu, A. (2014). *Teacher' and students' attitude towards the use of modern information and communication technology*. Kano: Researchgate.net.

- Tella, A., Toyobo, O. M., Adika, L. O. & Adeyinka, A. A. (2012). An assessment of secondary schools use of ICT: Implication for further development of ICT use in Nigerian secondary schools. *Journal of Science Educators*, 2 (1), 5-17.
- Thomas, S. (2005). Pervasive, persuasive eLearning: Modeling the pervasive learning space, *Proceedings of the 3rd International Conference on Pervasive Computing and Communications Workshops* 5 (1), 332-336.
- Wang, M. & Shen, R. (2011). Message design for mobile learning: Learning theories, human cognition and design principles, *British Journal of Educational Technology*, 1 (1), 3-10.
- Wentzel, P. Ron, V. L., Mathilde, M., Sytze, D. B. & Alfred, W. (2005). *Using mobile technology to enhance students' educational experiences*, Holand: Center for Applied Research.
- Zamani, B. E. (2014). Differences between boys' and girls' self-efficacy, motivation and attitudes towards applying mobile devices for learning ESL, *Journal of Education and Practice*, 37 (5), 29-37.